

### **REMARKS**

Reconsideration is requested.

The applicants affirm election of the subject matter of the Examiner's Group I for further prosecution.

The Examiner is requested to provide a complete PTO 892 Form, which includes the title of each cited Non-Patent Document.

Specifically, the PTO 892 Form received with the Office Action of July 5, 2007 fails to include the title of the cited Non-Patent Document.

The Examiner will appreciate that MPEP § 707.05(e) provides as follows:

#### 707.05(e) Data Used in Citing References [R-2]

37 CFR 1.104(d) (see also MPEP § 707.05 and § 901.05(a)) requires the examiner to provide certain data when citing references. The examiner should provide the citations on the "Notice of References Cited" form PTO-892 (copy at MPEP § 707.05). ...

#### III. < PUBLICATIONS

In citing a publication, sufficient information should be given to determine the identity and facilitate the location of the publication. ...

In citing periodicals, information sufficient to identify the article includes the author(s) and title of the article and the title, volume number issue number, date, and pages of the periodical.

#### See

[http://www.uspto.gov/web/offices/pac/mpep/documents/0700\\_707\\_05\\_e.htm#sect707.05e](http://www.uspto.gov/web/offices/pac/mpep/documents/0700_707_05_e.htm#sect707.05e) (August 29, 2007) (Emphasis added.)

The Examiner is requested to provide a new PTO 892 Form which includes the information required by the MPEP, such as is described in the above-quoted passage.

Claims 1-20 are pending.

The Section 102 rejections of claims 1-4 and 7 over Lupo (U.S. Patent No. 5,885,368) and Yoshikawa (PGPub 20020040728) are traversed. The Section 103 rejection of claims 5-6 and 8-9 over Lupo in view of Andriessen (WO2004/025748) and the Section 103 rejection of claims 5-6 and 8-9 over Yoshikawa in view of Andriessen are traversed. Reconsideration and withdrawal of the rejections are requested in view of the following distinguishing comments, as well the attached evidence.

The applicants submit that Examples 10 and 11 (column 26, line 58 to column 27, line 3; and column 27, lines 40-52) of Lupo disclose that a nanoporous layer of  $\text{TiO}_2$  was formed on a glass support and the thus obtained support was dipped into a dye solution (corresponding to the Ruthenium 535 dye of the present invention) rinsed with ethanol, and then dried in a warm air stream, thereby to obtain a  $\text{TiO}_2$  layer having an absorbance peak (maximum absorbance) at about 500nm.

However, it is a common practice (well-known technique) for a person of ordinary skill in the art to remove a solvent used for a dye solution or a solvent used for rinsing by volatilizing (evaporating) it by warm-air drying.

On the other hand, the thermal treatment of the present invention not only removes such a solvent but also shifts the absorbance peak of the dye to a shorter wavelength of, for example,  $490 \pm 35\text{nm}$ .

That is, the thermal treatment of the present invention and the warm-air drying disclosed in Lupo are different in their objectives, though they may both be heating.

Although Lupo discloses that a  $\text{TiO}_2$  layer having an absorbance peak at about 500nm was obtained, it is impossible for such warm-air drying as disclosed in Lupo to shift an absorbance peak of a dye to a shorter wavelength.

This will be clear to one of ordinary skill, such as from experimental results disclosed in the following attached documents:

(1) Md. K. Nazeeruddin et al., "Investigation of Sensitizer Adsorption and the Influence of Protons on Current and Voltage of a Dye-Sensitized Nanocrystalline  $\text{TiO}_2$  Solar Cell", Journal of Physical Chemistry B, 2003, Vol. 107, No. 34, p 8981-8987, 2003 (Reference 1).

(2) M.K. Nazeeruddin et al., "Conversion of Light to Electricity by *cis*- $\text{X}_2\text{Bis}(2,2'$ -bipyridyl-4,4'-dicarboxylate)Ruthenium(III) Charge-Transfer Sensitizers ( $\text{X}=\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CN}^-$ , and  $\text{SCN}^-$ ) on Nanocrystalline  $\text{TiO}_2$  Electrodes", Journal of American Chemical Society, Vol. 115, No. 14, p 6382-6390, 1993 (Reference 2).

Reference 1 teaches that in a solution of the Ruthenium 535 dye of the present invention (represented as N3 dye) and a  $\text{TiO}_2$  electrode to which the dye are absorbed, the absorbance peak of the dye is 535nm (see CHART 1 on page 8983; Figure 6 in the right column of page 8985; and Figure 7 in the left column of page 8986).

Reference 2 teaches that "the electrode was withdrawn from the solution under a stream of dry air or argon" (see 13<sup>th</sup> to 12<sup>th</sup> lines from the bottom of the left column of page 6384) and that the absorbance peak of a solution of the Ruthenium 535 dye of the present invention (represented as  $[\text{RuL}_2(\text{NCS})_2]$ ) is 534nm (see Table 1 on page 6384).

That is, the absorbance peak of the Ruthenium 535 dye solution and the  $\text{TiO}_2$  electrode to which the dye are absorbed does not change, being at 534-535nm.

Therefore, the applicants submit that the "about 500nm" as the absorbance peak disclosed in cited Reference 1 is an approximate (inaccurate) value or a misdescription. Lupo therefore is not believed to describe or suggest the claimed invention.

As for chemical treatment, as well as thermal treatment, not all chemical treatments as disclosed in Yoshikawa shift the absorbance peak of a dye absorbed thereby to a shorter wavelength. The absorbance peak of the absorbed dye is shifted to a shorter wavelength by the method recited in the present specification.

In the present invention, the dye-sensitized solar cell with improved solar cell properties (photoelectric conversion efficiency) can be obtained by using the "substrate in which the absorbance peak of the dye absorbed to the porous semiconductor layer is shifted to a shorter wavelength."

That is, neither cited Lupo nor Yoshikawa discloses or suggests a technique to shift an absorbance peak of a dye absorbed to a porous semiconductor layer or an effect to be obtained by the technique.

The claims are submitted to be patentable over Lupo and Yoshikawa.

The secondary reference (i.e., Andriessen) is not believed to cure the deficiencies of Lupo and Yoshikawa. Specifically, Andriessen is understood to only disclose the dye exemplified in the present invention as a spectrally sensitizing metallo-organic dye allowing for broad absorption of the solar spectrum. The claims are submitted to be patentable over the combinations of cited art.

The claims are submitted to be in condition for allowance and a Notice to that effect is requested. The Examiner is requested to contact the undersigned, preferably

FUKUI, A. et al.  
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Response

by telephone, in the event anything further is required to place the present application in condition for allowance.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

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